

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of: )  
)  
Gary K. Michelson )  
)  
Serial No.: (Cont. of 08/480,908) ) (Group Art Unit: 3764)  
)  
Filed: January 16, 2002 ) (Examiner: M. Brown)  
)  
For: THREADED FRUSTO-CONICAL )  
INTERBODY SPINAL FUSION )  
IMPLANTS )

Box PATENT APPLICATION  
Assistant Commissioner for Patents  
Washington, D.C. 20231

Sir:

**AMENDMENT**

Prior to the examination of the above application, please amend this application  
as follows:

**IN THE CLAIMS:**

Please cancel claim 1 without prejudice or disclaimer of its subject matter and  
add the following new claims:

--99. An interbody spinal fusion implant for insertion within an implantation space  
formed across the height of a disc space between adjacent vertebral bodies of a human  
spine, said implant comprising a body having a generally cylindrical configuration with  
an insertion end, a trailing end, a length between said ends, and an outer surface  
including a thread for engaging said implant to the adjacent vertebral bodies, the outer

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locus of said thread forming a substantially frusto-conical configuration along at least a portion of the length of said implant.

100. The spinal fusion implant of claim 99, wherein said body has a plurality of openings for retaining a fusion promoting substance.

101. The spinal fusion implant of claim 99, wherein said body has a central longitudinal axis and said thread has a thread radius measured from the central longitudinal axis of said implant, said thread radius being variable along the length of said implant.

102. The spinal fusion implant of claim 99, wherein said thread has a thread height measured from said body which is variable along the length of said implant.

103. The spinal fusion implant of claim 99, wherein said thread has a height measured from said body that is larger at said trailing end than at said insertion end.

104. The spinal fusion implant of claim 99, wherein said body has an internal chamber and an access opening for accessing said internal chamber.

105. The spinal fusion implant of claim 104, further comprising a cap for closing said access opening.

106. The spinal fusion implant of claim 104, wherein said internal chamber is capable of containing a fusion promoting substance.

107. The spinal fusion implant of claim 104, wherein said body includes a wall surrounding said internal chamber.

108. The spinal fusion implant of claim 107, wherein said wall has a plurality of openings passing therethrough in communication with said internal chamber.

109. The spinal fusion implant of claim 99, wherein at least one of said ends of said implant is adapted to engage instrumentation for the insertion of said implant.
110. The spinal fusion implant of claim 99, wherein said body has a central longitudinal axis and at least one truncated side forming a planar surface parallel to the central longitudinal axis.
111. The spinal fusion implant of claim 110, wherein said thread has a thread height measured from said body which is greatest at said truncated side.
112. The spinal fusion implant of claim 110, wherein said thread is continuous over at least a portion of said at least one truncated side.
113. The spinal fusion implant of claim 110, wherein said body has a second truncated side forming a planar surface parallel to the central longitudinal axis and opposite to said one truncated side.
114. The spinal fusion implant of claim 99, wherein said body has a plurality of openings passing therethrough so as to allow bone to grow from adjacent vertebral body to adjacent vertebral body and through said implant.
115. The spinal fusion implant of claim 99, wherein said implant is made of a material that is stronger than bone.
116. The spinal fusion implant of claim 99, wherein said implant comprises a bone ingrowth material.
117. The spinal fusion implant of claim 99, wherein said implant is at least in part bioabsorbable.
118. The spinal fusion implant of claim 99, wherein said body comprises a porous material.

119. The spinal fusion implant of claim 99, further in combination with a fusion promoting substance.
120. The spinal fusion implant of claim 119, wherein said fusion promoting substance is bone morphogenetic protein.
121. The spinal fusion implant of claim 119, wherein said fusion promoting substance includes hydroxyapatite.
122. The spinal fusion implant of claim 119, wherein said fusion promoting substance includes hydroxyapatite tricalcium phosphate.
123. The spinal fusion implant of claim 119, wherein said fusion promoting substance includes genes coding for the production of bone.
124. The spinal fusion implant of claim 119, wherein said fusion promoting substance is bone.
125. An interbody spinal fusion implant for insertion within an implantation space formed across the height of a disc space between two adjacent vertebral bodies of a human spine, said implant comprising a body having a substantially frusto-conical configuration along a sufficient portion of said body that is adapted to contact the adjacent vertebral bodies when implanted in the spine so as to maintain an angulation of the adjacent vertebral bodies relative to one another, said body having an insertion end, a trailing end, and an outer surface including a thread for engaging said implant to the adjacent vertebral bodies of the spine, the locus of said thread forming a substantially cylindrical configuration.
126. The spinal fusion implant of claim 125, wherein said trailing end is larger than said insertion end.

127. The spinal fusion implant of claim 125, wherein said insertion end is larger than said trailing end.
128. The spinal fusion implant of claim 125, wherein said body has a plurality of openings for retaining a fusion promoting substance.
129. The spinal fusion implant of claim 125, wherein said implant has a central longitudinal axis and a length along the central longitudinal axis, said thread beyond said insertion end having a thread radius measured from the central longitudinal axis of said implant that is substantially uniform throughout the length of said implant.
130. The spinal fusion implant of claim 125, wherein said implant has a central longitudinal axis, said thread having a thread radius measured from the central longitudinal axis of said implant that is variable along at least a portion of said implant.
131. The spinal fusion implant of claim 125, wherein said implant has a central longitudinal axis and a length along the central longitudinal axis, said thread having a thread height measured from said body which is variable along the length of said implant.
132. The spinal fusion implant of claim 125, wherein said thread has a height measured from said body that is larger at said trailing end than at said insertion end.
133. The spinal fusion implant of claim 125, wherein said body has an internal chamber and an access opening for accessing said internal chamber.
134. The spinal fusion implant of claim 133, further comprising a cap for closing said access opening.
135. The spinal fusion implant of claim 133, wherein said internal chamber is capable of containing a fusion promoting substance.

136. The spinal fusion implant of claim 133, wherein said body includes a wall surrounding said internal chamber.
137. The spinal fusion implant of claim 136, wherein said wall has a plurality of openings passing therethrough in communication with said internal chamber.
138. The spinal fusion implant of claim 125, wherein at least one of said ends of said implant is adapted to engage instrumentation for the insertion of said implant.
139. The spinal fusion implant of claim 125, wherein said implant is configured to be placed in close proximity in a side by side alignment to a second spinal fusion implant, said first and second implants when placed together having a combined overall width that is less than the sum of the individual maximum diameters of each of said first and second implants.
140. The spinal fusion implant of claim 125, wherein said body has a central longitudinal axis and at least one truncated side forming a planar surface parallel to the central longitudinal axis.
141. The spinal fusion implant of claim 140, wherein said thread has a thread height measured from said body which is greatest at said truncated side.
142. The spinal fusion implant of claim 140, wherein said body has a second truncated side forming a planar surface parallel to the central longitudinal axis and opposite to said one truncated side.
143. The spinal fusion implant of claim 125, wherein said body has a plurality of openings passing therethrough so as to allow bone to grow from adjacent vertebral body to adjacent vertebral body and through said implant.

144. The spinal fusion implant of claim 125, wherein said body comprises a porous material.
145. The spinal fusion implant of claim 125, wherein said implant comprises a bone ingrowth material.
146. The spinal fusion implant of claim 125, wherein said implant is at least in part bioabsorbable.
147. The spinal fusion implant of claim 125, wherein said implant is made of a material that is stronger than bone.
148. The spinal fusion implant of claim 125, further in combination with a fusion promoting substance.
149. The spinal fusion implant of claim 148, wherein said fusion promoting substance is bone morphogenetic protein.
150. The spinal fusion implant of claim 148, wherein said fusion promoting substance includes hydroxyapatite.
151. The spinal fusion implant of claim 148, wherein said fusion promoting substance includes hydroxyapatite tricalcium phosphate.
152. The spinal fusion implant of claim 148, wherein said fusion promoting substance includes genes coding for the production of bone.
153. The spinal fusion implant of claim 148, wherein said fusion promoting substance is bone.
154. An interbody spinal fusion implant for insertion within an implantation space formed across the height of a disc space between adjacent vertebral bodies of a human spine, said implant comprising:

a leading end for insertion first into the disc space, a trailing end opposite said leading end, a central longitudinal axis therebetween, and a length along the central longitudinal axis;

opposed arcuate portions between said leading and trailing ends adapted to be placed within the implantation space oriented toward the adjacent vertebral bodies, respectively, said opposed arcuate portions having at least one opening therethrough, said openings being in communication with one another to permit for the growth of bone from adjacent vertebral body to adjacent vertebral body through said implant;

at least one truncated side along at least a portion of the central longitudinal axis between said opposed arcuate portions and between said leading and trailing ends; and

a thread along at least a portion of the length of said body adapted to engage said implant to the adjacent vertebral bodies, said thread having a thread height measured from said body which is greatest at said at least one truncated side.

155. The spinal fusion implant of claim 154, wherein said opposed arcuate portions are in an angular relationship to each other along at least a portion of the length of said implant sufficient to maintain the adjacent vertebral bodies in an angular relationship to each other.

156. The spinal fusion implant of claim 155, wherein said implant is configured to be inserted from a posterior approach to the vertebral bodies.

157. The spinal fusion implant of claim 155, wherein said implant is configured to be inserted from an anterior approach to the vertebral bodies.



158. The spinal fusion implant of claim 154, wherein each of said opposed portions comprises an interior surface, said interior surfaces being spaced apart to define a hollow interior in communication with said openings.

159. The spinal fusion implant of claim 158, wherein said implant includes an access opening for accessing said hollow interior.

160. The spinal fusion implant of claim 159, wherein said access opening is configured to permit introduction of a fusion promoting substance into said hollow interior.

161. The spinal fusion implant of claim 159, further comprising a cap for closing said access opening.

162. The spinal fusion implant of claim 154, wherein said body has a second truncated side along the central longitudinal axis and opposite to said one truncated side.

163. The spinal fusion implant of claim 154, further in combination with a fusion promoting substance.

164. The spinal fusion implant of claim 163, wherein said fusion promoting substance is bone morphogenetic protein.

165. The spinal fusion implant of claim 163, wherein said fusion promoting substance includes hydroxyapatite.

166. The spinal fusion implant of claim 163, wherein said fusion promoting substance includes hydroxyapatite tricalcium phosphate.

167. The spinal fusion implant of claim 163, wherein said fusion promoting substance includes genes coding for the production of bone.

168. The spinal fusion implant of claim 163, wherein said fusion promoting substance is bone.—.

**REMARKS**

Applicant cancelled claim 1 and added new claims 99-168 to further define Applicant's claimed invention.

Entry and consideration of this Amendment prior to the examination of the above-identified application is respectfully requested.

If there are any fees due in connection with the filing of this Amendment, please charge the fee to our Deposit Account 50-1066.

Respectfully submitted,

MARTIN & FERRARO, LLP

Dated: January 16, 2002

By: \_\_\_\_\_

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